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ABSTRACT

Two experiments investigated preschool children's use of the words "big" and "little" in three different ways (normative, perceptual, and functional) and in different contexts. The first experiment tested the sensitivity of 2-, 3-, and 4-year-olds to relational standards by asking them to judge an object's size in relation to different-sized objects. In this experiment, the children accurately judged an object's size according to a stored mental (normative) standard and also made accurate perceptual judgments when presented with a comparison. No age differences were found. The second experiment set up a conflict between normative and functional standards and required each child to judge an object's size both by itself and in relation to a particular function (use by dolls of different sizes). Children in all age groups performed above the chance level, and performance improved with age. In addition, children of all ages judged the size of the doll's clothing more accurately than tools for the dolls' use. (MSE)

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NONEGOCENTRIC USES OF "BIG" AND "LITTLE" BY PRESCHOOL CHILDREN

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Psychologists have assumed that children learn and use words that make sense to them. If so, early use of a word implies that a child has an early grasp of the underlying concept. The words "big" and "little" emerge very early -- between 1 and 2 years of age (Robb & Lord, 1981). Yet in spite of this, there is a longstanding impression in the literature that young children cannot understand the relative nature of "big" and "little." Early research suggested that relative judgments (choosing the smaller of two squares, for example) were more difficult to make than absolute judgments (e.g., Alberts & Ehrenfreund, 1951; Kuenne, 1946). Surprisingly, this impression has remained even though later research demonstrated that young children can in fact make relative judgments (e.g., Bryant, 1974; Sera & Smith, 1987). In a recent textbook on developmental psychology, for example, Shaffer (1985) writes, "... 2-3 year-olds do not truly understand the meaning of relational adjectives such as big or little. If a toddler can easily handle an object, he is likely to describe it as 'little'; but if the object is cumbersome or difficult to manipulate, it is 'big' ... Only later will children come to realize that big and little are relative terms, so that a motorbike might be described as 'big' when compared with a tricycle but 'little' when compared with a car" (p. 298).

Obviously the issue of what "big" and "little" mean to children remains unsettled. We suggest that one reason for the lack of agreement is that these terms are more complex than they seem. Dimensional adjectives are inherently relational and actually have no absolute meaning. In other words, whenever the term "big" or "little" is used to describe an object, the user must be taking into account some relationship between the object and a standard.

Adults use at least three different kinds of standards in judging whether something is big or little. The first standard is normative: an object is seen by itself, compared to some stored mental standard for objects of that kind, and judged relative to that standard. For example, a hat seen by itself is judged as big or little for a hat. A second use is perceptual: an object is seen with another object of the same type and its size is judged relative to that object. For example, two hats of different sizes are presented and one is judged as big or little relative to the other. A third use can be called functional: an object is examined in terms of how well it fulfills or could fulfill an intended function. For example, a hat can be judged as big or little for a doll, depending on how well it would cover the doll's head.

These three standards can conflict. For example, a hat can be big using a normative standard but little using a perceptual standard -- that is, big for a hat but little compared to the hat next to it. Or a hat can be little using a normative standard but big using a functional

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standard -- that is, little for a hat but big for a doll that is extremely small. Adults are able to use context to decide which word to use. For example, if a hat is shown with a larger hat an adult could describe it as little, but if the same hat is shown with a tiny doll the adult could describe it as big. So correct use of the words "big" and "little" is not at all trivial: it means that an individual can use the terms in at least three different senses and can switch from one use to another depending on context.

The present studies examine whether young children can use "big" and "little" in these three ways, and whether they can use different standards in different contexts. Our basic findings are that children understand that these words describe relationships between objects, that they can use the terms "big" and "little" in all three ways described above, and that they can switch from one standard to another depending on context. We report two studies in the present paper. The first shows children's keen sensitivity to different relational standards; the second suggests that some standards are more difficult than others.

Experiment 1

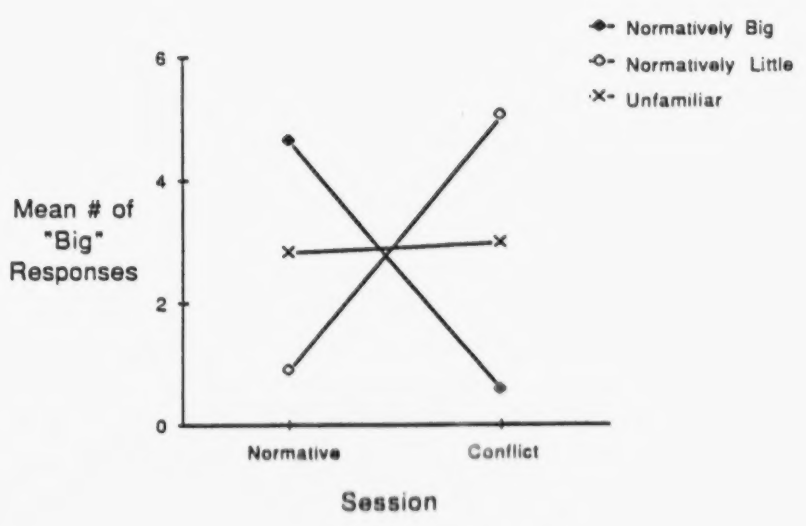
In the first study we focused on the two standards we hypothesized would be easiest for children to apply, normative and perceptual. There were two sessions, one examining children's ability to use normative standards and another designed to look at how children would perform when either a normative or a perceptual standard could be used. In the first session the experimenter brought out a variety of objects, one at a time, and asked the child whether each one was big or little. All of the objects were about the same size. However, some were normatively big, some were normatively little, and others were unfamiliar. For example, we included an egg that was nearly 4 inches long (big for an egg), a box of cereal that was 4 inches tall (comparable to the egg in its longest dimension but little for a box of cereal), and a bicycle reflector (about the same size as the egg and the box of cereal but relatively unfamiliar). We predicted that children would draw on their stored mental standards to label the familiar objects and therefore would call the egg "big" and the box of cereal "little." However, because the bicycle reflector was a relatively unfamiliar object, it was unlikely that children would have normative standards for it. Therefore we predicted that the bicycle reflector would not be consistently labeled as either "big" or "little." In all, children were tested on 18 items: six that were normatively big, six that were normatively little, and six that were unfamiliar.

In the second session, we asked children to judge the same objects they had already judged in the first session. This time, however, we arranged a conflict between two different standards in order to see whether the children could shift from one standard to another as context changed. Recall that in the first session items were presented one at a time, so that the only basis for judging size was relative to

a stored mental standard children had of other objects of that kind. In the second session children could still make a normative judgment, but we also made it possible for them to make a perceptual judgment by bringing out two objects of the same kind. For example, on one item we paired the 4-inch egg described earlier with an egg that was even bigger. Children were again asked whether the 4-inch egg was big or little. If children were still using a normative standard they would judge it as big; if they switched to using a perceptual standard they would judge it as little. Similarly, we paired the 4-inch box of cereal described earlier with an even smaller box of cereal. Children could judge the 4-inch box as either little (using a normative standard) or big (using a perceptual standard). Finally, we paired each unfamiliar object with another unfamiliar object of the same type. Half the time the new object was larger than the original object; half the time it was smaller. Because children probably do not have a strongly established sense of the normative size of unfamiliar objects, we expected they would make perceptual judgments with those items.

We conducted Experiment 1 with 12 2-year-olds (M = 2-9), 12 3-year-olds (M = 3-10), and 12 4-year-olds (M = 4-9). Each child was tested in both conditions: Normative (seeing each object individually), and Conflict (seeing each object paired with another of the same kind). For every trial, the child was asked whether the target object was big or little. For example, on the egg item, the experimenter said, "See this egg? Is it a big egg or a little egg?" The results are shown in Figure 1.

Figure 1.



Subjects of all ages were able to use both kinds of relative standards, as seen by a significant object type x session interaction, $F(2,66) = 319.52$, $p < .0001$. In the Normative condition children appropriately judged the normatively big objects as "big," the normatively little objects as "little," and the unfamiliar objects as "big" half the time and as "little" half the time. Since all of the objects were approximately the same absolute size, children had to use a stored mental standard to produce these correct results. In the Conflict condition children switched to a perceptual standard. They judged the normatively big objects as "little" (because they were paired with objects of the same kind that were even bigger), the normatively little objects as "big" (because they were paired with objects of the same kind that were even smaller), and the unfamiliar objects as either big or little, depending on the size of the object next to them.

In other words, when an object is presented by itself, children judge it accurately according to a stored mental standard; when it is presented with another object of the same kind, they compare it to that object and make a perceptual judgment. There were no age differences; even the 2-1/2-year-olds performed very well. It is interesting that children switched so readily from a normative standard to a perceptual standard, depending on the context. The wording we used implied a normative standard in both conditions ("Is this a big egg or a little egg?"), yet children nearly always switched to a perceptual standard when they had a choice.

Experiment 2

In Experiment 2 we examined children's use of functional standards. This kind of judgment was first studied about 10 years ago by Susan Carey (reported in deVilliers & deVilliers, 1978, pp. 135-136). In Carey's study, young children were introduced to a set of dolls, with a table and tea set of the right size for the dolls. After a few minutes of playing "tea party," the experimenter told the children that the dolls needed a glass to drink from, and produced a shot glass which was of course small for a glass but enormous for its intended use. When 2- and 3-year-olds were asked whether the glass was "big" or "little" for the dolls, they incorrectly said it was little. This was an incorrect response because the glass was intended for the dolls and was much too big for them to drink out of. Four-year-olds, on the other hand, answered correctly that the shot glass was big for the doll.

It seemed from this study that young children have difficulty with functional judgments. Apparently they judged the glass from their own perspective -- little for themselves -- rather than from the doll's perspective. The task we developed allowed us to study children's use of functional standards in more depth.

On each item of our task, children judged the size of an object relative to a doll. In order to assess both "little" and "big," we used two dolls, one that was large (150 cm long) and one that was small

(12 cm long). Each doll was shown with eight items, four of which were clothes and four of which were tools. The clothes included items such as a mitten, shoe, and shirt; the tools included items such as a cup, toothbrush, and scissors. We included both clothes and tools because children might have more experience judging clothes for a doll.

Children were shown each object with the appropriate doll and were asked whether the object was big or little for the doll. Items shown with the big doll were too little; items shown with the little doll were too big. For example, the big doll was shown with a shoe that was normatively large, but too small for the doll to put on her foot. Similarly, the little doll was shown with a hat that was normatively little, but completely covered her head. In general, items were chosen so that the misfit was fairly obvious.

To summarize, in Experiment 2 we set up another conflict situation, but in this case the conflict was between normative and functional standards, instead of between normative and perceptual standards. The objects used with the little doll were normatively little but big for the doll. The objects used with the big doll were normatively big but little for the doll.

We also included a condition in which children judged the size of each object presented by itself. This condition, which we call the Normative condition, was included as a control, to ensure that children knew the typical sizes of the objects we were using. In the Normative condition we used the same items as in the Doll condition, but children never saw the dolls. They were simply shown each object, one at a time, and were asked whether it was big or little.

If children are sensitive to both normative and functional standards they should label the objects differently in the two conditions. They should label the little objects as "little" in the Normative condition, but "big" in the Doll condition. Similarly, children should label the big objects as "big" in the Normative condition, but "little" in the Doll condition.

72 children participated in the study, 24 3-year-olds (M = 3-6), 24 4-year-olds (M = 4-6), and 24 5-year-olds (M = 5-6). At each age, there were 12 children in the Normative condition and 12 in the Doll condition.

As shown in Figure 2, there were three main findings. First, children in all three age groups in both conditions performed above chance overall, $p < .05$. So children as young as age 3 are capable of making nonegocentric functional judgments. In fact, it is remarkable how well children adapted their answers to the dolls, given that they were extremely interested in how they could interact with the objects themselves. For example, they would try to put the mitten on their fingers or would try the watch on their own wrist.

The second finding was that performance on the Doll task improved with age, as shown by an age x condition interaction, $F(2,66) = 7.15$, $p < .002$. This suggests that even though 3-year-olds can interpret "big" and "little" in nonegocentric ways, they sometimes find it difficult. These conclusions were supported by the spontaneous comments of some of the children. One 5-year-old, when shown the scissors for the little

Figure 2.

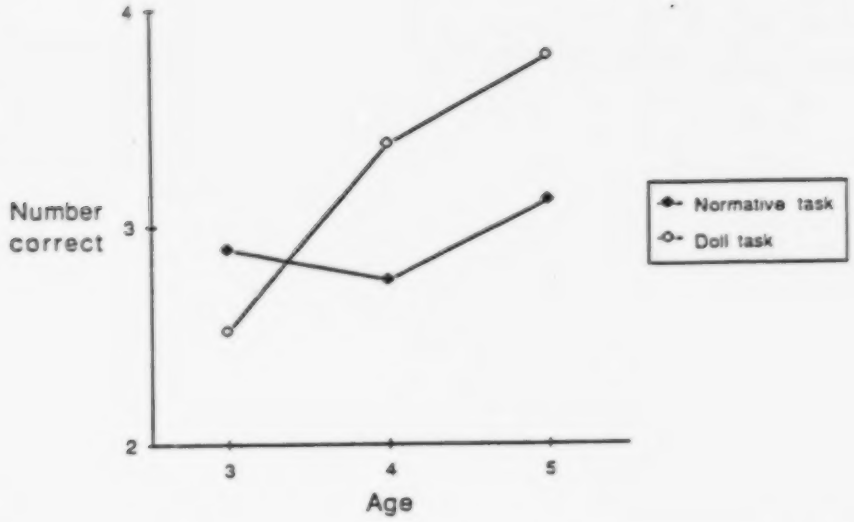
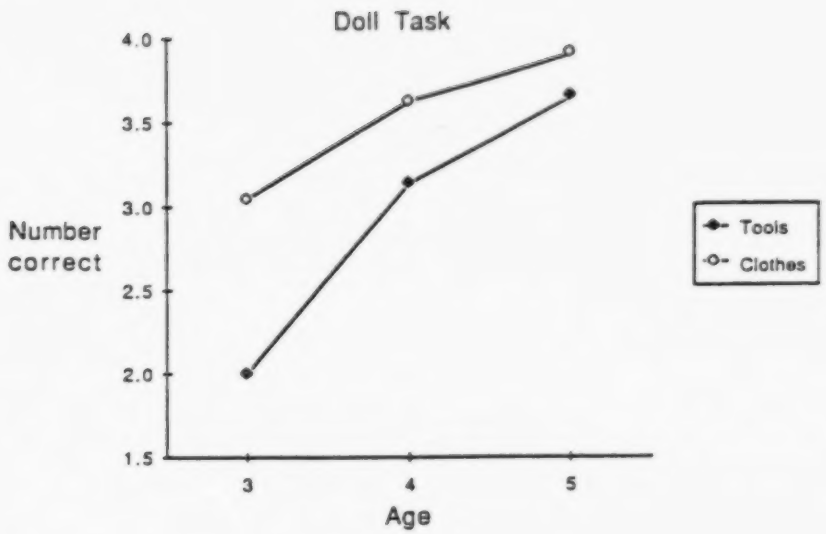


Figure 3.



doll, said, "[It's] big, because you're supposed to be able to use your fingers and she has small fingers." Another child, age 4, when shown the cup with the big doll said, "It's little. It's good for people to drink out of but not for her [the big doll]." On rare occasions even 3-year-olds sometimes spontaneously justified their answers. For example, one child when shown the shoe with the big doll said, "[It's] little, because the doll has big feet." Another 3-year-old, when shown a comb with the big doll, correctly pointed out, "It's little and it's big for me."

In contrast, there were no changes with age on the Normative task. This is consistent with the finding in Experiment 1 that even young children could readily make normative judgments.

The third finding from this study is shown in Figure 3. Children at all ages judged clothing for the doll more accurately than tools for the doll, as seen in an object type x condition interaction, $F(1,66) = 6.46$, $p < .02$. The youngest children especially had difficulty and performed at chance when judging tools relative to the dolls. (This replicates what Carey had found: young children could not judge a normatively little cup relative to a little doll.)

It is not clear why children found it easier to judge clothes than tools. As mentioned before, one possibility is that children have more experience talking about the size of clothing and trying clothes on dolls than they do talking about the size of tools. Another possibility is that children found it difficult to judge tools because they had to make spatial inferences on such items. The clothes were actually tried on the doll and children could observe that they did not fit. In contrast, although the tools were placed in the doll's hand, children still had to figure out which comparison to make. When judging whether the pair of scissors was big or little for the doll, for example, they had to compare the size of the scissors with the size of the doll's hand and then imagine what it would be like if the doll were actually using the scissors.

To summarize, there were two main findings from these experiments. First, by age 2-1/2 children understand that "big" and "little" are relative terms. They can use either a normative or a perceptual standard as a basis for judging an object to be "big" or "little," and can switch between these two standards depending on context. Second, by age 3 children can judge the size of an object in relation to its intended use, as long as that relationship can be observed. Problems do seem to arise when the relationship must be inferred.

From our view, the most impressive finding concerns the complexity of these words and the skill with which they are used. Children are fully aware of the relational meanings of "big" and "little," they can judge an object as "big" or "little" according to three different standards, and they are sensitive to context in deciding which standard to use. Compared to these achievements, a few minor difficulties in making functional judgments hardly seem like a problem at all.

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